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ABSTRACT

This paper explores the effects on school achievement of the following variables: (1) intelligence; (2) social class; (3) early motor and language development; (4) preschool experience; (5) gender; and (6) composition of household. The subjects were 65 children of 9 to 11 years, in grades four to six, in Puerto Rican public schools. They were selected from the sample of 2,200 children used for adapting the Weschler Intelligence Scale for Children Revised (WISC-R) for the Puerto Rican population so that they would exemplify the demographic characteristics of the larger group. The WISC-R Puerto Rico was used to measure IQ. Parents completed a questionnaire providing data on development, family background, and school experience. Grade point average (GPA) was the dependent measure of school achievement. Multiple regression analysis revealed that IQ and social class explained half of the variance in GPA. Parental characteristics and social factors had an impact on boys' GPA and IQ that was not observed for girls. Effects of the other variables were not significant. It is suggested that further research is needed to examine the effects of class, gender, and family situation on school achievement. (Contains 40 references.) (MDM)

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Running head: Effects on School Achievement

Abstract

The effect of seven independent variables on school achievement was explored with the following research question: How do intelligence, social class, early motor and language development, pre-school experience, gender and composition of household contribute to school achievement of children in Puerto Rican public schools? The subjects were 65 children aged 9 to 11 years, studying in grades four to six, at seven urban public schools. They belonged to the sample of 2,200 children selected for adapting the Weschler Intelligence Scale for Children Revised (WISC-R) for the Puerto Rican population. Multiple regression analyses showed that IQ (Beta = .66) and Social Class (Beta = .30) explained half of the variance in Grade Point Average (GPA) (Adjusted R^2 = .49). Pearson r's between GPA and Social Class (.40) and GPA and IQ (.66) were significant at the .01 level. When boys and girls were compared, parental characteristics and social factors had an impact on boy's GPA and IQ that was not observed for the girls. The results support the salient influence of social class and a stronger effect of family variables on boys' achievement than on girls' GPA.

School achievement has a substantial impact on children's opportunities for advancement in society. In America today, completing a formal education may be a prerequisite for both success and survival in life (Presseisen, 1988). On the other hand, poor performance in school has been linked to social and behavioral problems, particularly in disadvantaged populations. The impact of school failure in the U.S.A. is severe enough to describe this country as a "nation in crisis" instead of a "nation at risk", according to Kunisawa (1988). Some critical issues facing the schools are violence, low academic performance in math and science, declining employment prospects for dropouts and poor conditions in general for minorities. All of these concerns affect the future of individual citizens, U.S. economic competitiveness and the structure and cohesiveness of American society and culture (U.S. Department of Education, 1991).

The situations described for the U.S. have an impact on the Puerto Rican educational system, considering the close social and political ties between the Island and the United States. Puerto Rican society values education highly and regards schooling as a prime means for achieving a comfortable and satisfying life style. Quintero-Alfaro (1974), a former Secretary of Education, describes the purpose of schooling as a means for promoting the development of persons capable of facing future problems with intelligence, valor and equanimity. This noble goal has not always been attained in Puerto Rico. Social ills such as mental illness, violence, drug abuse and vandalism have been linked to the failure of the Island's public school system (Seda-Bonilla, 1987; Torres-Zayas, 1981).

Knowledge derived from scientific studies of children's development and learning is needed to assist in developing and evaluating effective educational programs for Puerto Rican children. Research has been described as useful for social policy by Scarr & Weinberg (1978). These authors indicate that governments can do a better job of designing effective intervention programs if people know which variations in the environment make a difference and which do not. The average level of a culture's environment determines the average level of achievement: by providing

good schools, nutrition, health care, and psychological services, a society can raise the overall level of health and attainment for the whole population.

A student's school success- or lack of it- is the result of a complex set of variables which transcend the individual and the institution in which he or she studies. Research on school achievement needs to focus on psychological, societal and environmental factors which impinge on the learner and the learning outcomes. Intelligence, social class and language skills are consistently identified as critical in their impact on school achievement. Other variables that have been associated with achievement but whose impact has not been demonstrated as clearly are: gender, motor skills, composition of household and pre-school experience. The present study focused these variables and their effects on school achievement of Puerto Rican children. The following sections presents a brief review of related research.

Intelligence

Intelligence is described as the most controversial of all psychological concepts (Weinberg, 1989). It is usually conceptualized according to one of two models: on the one hand, a general, unified capacity for acquiring knowledge, reasoning and solving problems, or a series of separate mental abilities that operate more or less independently. Some theorists associated with the general model include Alfred Binet, Theodore Simon and Charles Spearman, the creator of the general intelligence or "g" factor. The history of this field of theory and practice encompasses several centuries and intense work in many countries, notably France, Germany and the United States (Anastasi, 1988; Sattler, 1982).

The notion of separate mental abilities in intelligence has been proposed by Louis Thurstone, J.P. Guilford, and later by Howard Gardner (1985). Gardner describes seven kinds of intelligence, each of which entails a set of skills for solving, finding or creating problems. He identified these constructs as: linguistic, musical, logical-mathematical, spatial, bodily-kinesthetic and personal intelligences. Each of them follows a different developmental path which cannot be

adequately measured with traditional IQ tests. Gardner's Multiple Intelligences (MI) theory has inspired a number of pilot projects which include the development of intelligence-fair assessment measures and innovative school programs that promote learning in context, creative expression and other changes in school atmosphere (Blythe and Gardner, 1990).

A contrasting view was advanced by Piaget, who focused on discovering qualitative developmental changes in the ways children perceive, understand and operate on their environments (Furth, 1970). He believed that cognitive processes emerge as a result of developmental reorganization of psychological structures resulting from the individual's interaction with the environment. Generally, psychometric procedures assess **what** we know (the product); Piagetian techniques probe **how** we think (the process). Studies show that Piagetian and psychometric scales of intelligence in infant, pre-school and school age populations yield positive, moderate correlations (Sattler, 1982). There appears to be a general factor common to Piagetian and standard IQ tasks.

Other approaches to the study of intelligence include information-processing and the Sternberg triarchic theory of Intelligence, which is based on three elements:

— Intelligence must be understood within a sociocultural context.

— Intelligence is purposeful, goal oriented, relevant behavior consisting of two general skills: ability to deal with novel tasks and ability to develop expertise or learn from experience to perform mental tasks effortlessly or automatically.

— Intelligence depends on acquiring information-processing skills and strategies.

(Sternberg, 1988, 1985)

Weinberg (1989) discusses the issue that IQ tests are not a fair sample of a person's entire repertoire of adaptative behavior and are not adequate indicators of the quality and character of human functioning. He also points out that in the public policy arena, IQ tests have been sharply

criticized for their misuse as outcome measures in evaluating or accounting for the effectiveness of social intervention programs, such as Head Start. Some believe that social competence should replace IQ as the major barometer of success of social interventions. Such indexes, although not ignoring IQ, would also take into account adaptative, motivational and emotional attributes of the individual (Scarr, 1981).

Ryan (1976) elaborates on the issue of inadequately judging children's abilities when comparing all children to a standard pertinent to middle class, small town America. This leads school administrators and teachers to describe as handicaps or disabilities what may be differences in styles related to culture or class. The child is thus considered unable to learn or otherwise inadequate, instead of focusing on school problems such as insensitive teachers, rigid curricula or deficient materials and environments.

Social Class

Schools play essential roles in the process of social development. They are entrusted with the task of providing the cognitive skills required to carry out diverse occupations in a modern economy (Irizarry, 1989). Presumably, schooling is the vehicle for achieving higher socioeconomic status, if occupation and income are determined more by achievement than by ascribed or inherited traits. This notion is at the core of the "American dream" in which positions in the social division of labor would be attained as a result of one's efforts and talents rather than one's social position at birth (Bowles, 1977). This ideal of a wholly open, democratic society in which education assures equality of opportunity to rise in the social structure has been challenged by several authors (Althusser, 1984; Ryan, 1976). Sewell (1981) indicates that equality of educational opportunities has been strikingly limited for persons whose language and ethnic and/or caste background is "different" from the dominant culture. In addition, school is instrumental in preserving social inequality, denying the basic values and principles of an egalitarian democratic society (Irizarry, 1989).

In Puerto Rico, the relationship between university level education and economic opportunity was examined through measures of salary in the first job and other factors related to socioeconomic background of graduates who had attended the diverse undergraduate programs at the University of Puerto Rico during the 1982-83 academic year. The researchers concluded that persons who come from more favorable socio economic environments have advantages for obtaining better paying jobs. This result indicates that the labor market discriminates taking into account the characteristics of the individual's background, which tends to preserve the initial inequalities in society, in spite of the equalizing effects that a university education may have (Cao and Matos, 1988).

In sum, the influence of the socio-economic background of a student on his or her probabilities of succeeding in school is intertwined with complex sets of variables, including value systems, social relationships and school policies. Thus, the relationship between measures of school success and social class cannot be interpreted solely in terms of larger or smaller income levels.

Language acquisition and skills as foundations for school achievement

Language skills are essential for school achievement and for many other areas of achievement throughout life as well. Gardner elaborates on the implications of language when he states: "one could not hope to proceed with any efficacy in the world without considerable command of the linguistic tetrad of phonology, syntax, semantics and pragmatics." (1983, p. 77).

The development of language skills is the most important means of interacting with others; it is also the most important means of self-expression and self-realization (Ross, Garrison & Morgan, 1985). Rice (1989) indicates that if children cannot master the fundamentals of language during their preschool years, they are greatly at risk for poor educational achievement, particularly for deficient reading skills. Furthermore, their limited verbal skills affect their social skills.

Motor Skills

Physical development has an important bearing on a child's total development. Ross, Garrison and Morgan (1985) present a comprehensive view of development when they indicate that motor skills have an impact on such aspects as a child's self-concept, socialization, self entertainment, release of tensions, self-reliance, and mental and physical health. Studies of the relationship between mental efficiency and academic performance show conflicting results: some show beneficial effects and some show no effect (Johnson, Updike, Stolberg & Schaefer, 1966). However, most authorities in physical education feel increased attention should be paid to motor skill development in children (Ross, Garrison & Morgan, 1985, p. 154).

Gender

Reflecting on decades of research on sex differences, Maccoby (1990) indicates that there is increasing use of meta analysis to reveal not only the direction of sex differences but quantitative estimates of their magnitude. She also reports the following conclusions related to school performance:

— there are sex differences of moderate magnitude in performance on tests of mathematical and spatial abilities

— sex differences in verbal abilities have faded in recent years

— other aspects of intellectual performance continue to show gender equality

According to Jacklin (1989) there is a long history of interest in gender differences in the measurement of intellectual abilities and a large accumulation of empirical findings. She concludes that "gender is not an important variable in the measurement of intellectual abilities" (p. 131).

A review of research dealing with the effects of the mother's employment on the family commented studies of differences in cognitive performance. Results showed an interaction

between the variables social class and gender. Among lower-class, economically pressed families, employed mothers' children did better. In blue-collar families differences were either not significant or favored the children of employed mothers. In the middle class, it was found that maternal employment was associated **with lower IQ's and school performance of boys only** (emphasis ours). These findings were tentatively explained as a result of class and gender differences in independence training but further information is needed (Hoffman, 1989).

Social class and gender may also interact with cultural variables, so these variables need to be explored in different ethnic groups. A notable effort to study the urban Puerto Rican child, published by Guevara and Sesman in 1978, explored class and gender differences. One of the few differences found when comparing gender groups was that boys were expected to reach a higher level of schooling and occupational status than girls.

Pre school experience

Ron Haskins (1989), of the Committee on Ways and Means of the U.S. House of Representatives expressed strong support for government sponsoring of pre-school programs. His review of research on efficacy in early childhood education reveals that effects of Head Start on school performance are modest and there is almost no evidence of positive impact on measures of life success. However, he considers the benefits for poor children such as good nutrition and health care valuable enough to continue sponsoring the program and seeking ways to improve its efficacy. Options may be identified through research of a multidisciplinary nature which combine knowledge of the diverse factors which influence complex social problems (Jacklin, 1989).

Procedure

The subjects were 65 children aged 9 to 11 years, studying in grades four to six, at seven urban public schools. They belonged to the sample of 2,200 children selected for adapting the Weschler Intelligence Scale for Children Revised (WISC-R) for the Puerto Rican population. The

demographic characteristics, developmental milestones and other measures of this sample present similar trends to those of the complete standardization group.

Intelligence was measured with the WISC-R Puerto Rico. Parents completed a General Information Questionnaire which provided data on development, family background, and school experience. Grade Point Average (GPA) was the dependent measure of school achievement.

Results

Multiple regression analyses showed that IQ (Beta = .66) and Social Class (Beta = .30) explained half of the variance in GPA (Adjusted R^2 = .49). Pearson r's between GPA and Social Class (.40) and GPA and IQ (.66) were significant at the .01 level. When boys and girls were compared, parental characteristics and social factors had an impact on boy's GPA and IQ that was not observed for the girls.

The effects of language acquisition, motor skills and pre-school experience on school achievement of the children in this sample were not significant

Discussion

Intelligence and social class explained 49% of the variance in GPA in the group of middle and lower class Puerto Rican children studied. The independent variable which appears to have greatest impact on GPA is Intelligence as measured by standardized IQ tests. This result supports the validity of the WISC-R adapted to Puerto Rico as an instrument for the psycho-educational assessment of Puerto Rican children.

The variable which had most influence on GPA after IQ was social class. The relationship of both cognitive ability and socioeconomic status to predicting job success was discussed in an extensive literature review by Barret and Depinet (1991). Some of their conclusions are: grades and intellectual ability tests predict occupational success; tests results are not an artifact of social status, nor are they unfair to minorities. They also indicate that the effects of socio economic status

(SES) on variables which influence later outcomes, such as parents' education, values and attitudes, must be examined further.

Socio economic realities and their effects on the family have been intensely studied for decades, as reported by Hoffman in a Master Lecture sponsored by the American Psychological Association in 1989. Her review includes evidence of differences by gender that suggest that the effects of employment and class variables are more complex for boys than for girls. In this study significant moderately high correlations were found between Mother's and Father's Education respectively with GPA, Total IQ and Verbal IQ of boys. In contrast, these same pairs of correlations were not significant for the girls group. Apparently, girls' cognitive potential and achievement is relatively independent of parent's education in the group of public school students included in this sample. In a review of studies on gender and social influence, Eagly (1983) indicates that girls and boys are exposed to different socialization pressures and that agents of socialization, such as parents and teachers attempt to prepare children for the behaviors expected of their gender group. Along these lines, the results presented earlier could lead to the interpretation that males are expected to attain scholastic achievements and develop cognitive skills attuned to or better than those achieved by their parents. However, the same expectation would not be transmitted to girls. Therefore, boys would be more likely than girls to benefit from parent's modeling in terms of reaching educational goals. Conversely, when parent's educational achievements are limited, it would be harder for boys than girls to surpass the parents.

The results of the present study point towards the desirability of exploring the following questions more fully:

1. How does belonging to the lower class deteriorate opportunities for school achievement and what can the school system do to promote school success in lower class students?

2. Which factors contribute to enhancing opportunities of school success for both male and female students and what strategies should be implemented which benefit both sexes according to their different needs?

3. What conditions or characteristics of families tend to enhance opportunities for school success and what can the school system do to promote appropriate support from families?

Nelson (1991/92) discusses the need to revise public policies which establish the white, male experience as the standard and proposes a new culture for schools which includes responsible behavior in personal and family relationships. She expresses concern that "family relationships- human relationships- are at the very heart of life, and yet they are considered peripheral to serious learning", (p. 67). The National SEED Project (Seeking Educational Equity and Diversity Project on Inclusive Curriculum) developed at the Wellesley College in Massachusetts is recommended by Nelson in order to involve teachers in systemic change by bringing issues of race, gender, class and ethnicity into their classrooms.

The spirit of Puerto Rico's Constitution and the purposes stated in Law 68 which creates the Puerto Rico Department of Education are invitations to pursue learning which harmonize with the "pursuit of happiness" proclaimed in the U.S. Constitution. The P.R. Department of Education is responsible for creating the conditions which facilitate school success in all students or creating the "Temples of Truth" as Hostos, Puerto Rico's foremost educator, called schools. The knowledge derived from research efforts by Puerto Rico's newly developing community of school psychologists is a valuable contribution to the viabilization of school success. The results of this study are presented with the firm conviction that psychological science has an essential role in education and that the Puerto Rican people will benefit from the collaborative efforts of these disciplines.

References

Althusser, L. (1984). Ideología y aparatos ideológicos de Estado. [Ideology and ideological apparatus of the State]. Buenos Aires, Argentina: Ediciones Nueva Visión.

Anastasi, A. (1988). Psychological Testing, 6th Edition. New York: Macmillan Publishing Co. 817 pp.

Barrett, G.V. & Depinet, R.L. (1991). A reconsideration of testing for Intelligence. American Psychologist, 46, 1012-1024.

Bidol, P. & Arima, R. (1982). Multicultural perspectives in human relations training. Reading Book for Human Relations Training- Seventh Edition. Arlington, Virginia: NTL Institute. 22-23

Bowles, S. (1977). Unequal Education and the Reproduction of the Social Division of Labor. in Karabel, J. & Halsey, A.H. Power and Ideology in Education. New York: Oxford University Press.

Brandt, R. (1991, December/1992, January). A caring community. Educational Leadership, 49, 4, p. 3.

Cao, R.J. & Matos, H. (1988). Educación Universitaria y Oportunidad Económica en Puerto Rico. [University education and Economic opportunity in Puerto Rico] Madrid: Editorial Betania.

Eagly, A.H. (1983). Gender and social influence: A social psychological analysis. American Psychologist, 34, 971-981.

Faure, E., Herrera, F., Abdul-Rozzak, K., López, H., Ptrovsky, A., Rahnema, M., & Ward, F.C. (1973). Learning to be: The World of education today and tomorrow. Paris: UNESCO and Toronto: Ontario Institute for Studies in Education. 313 pp.

Furth, H.G. (1970). Piaget for Teachers. Englewood Cliffs, N.J.: Prentice-Hall.

Gardner, H. ((1985). Frames of Mind: The theory of Multiple Intelligences. New York: Basic Books.

Guevara, C.I. & Sesman, M.J. (1978). La madre y el aprendizaje del niño: La experiencia urbana puertorriqueña. [The Mother and the child's learning: The Puerto Rican urban Experience]. Hato Rey, Puerto Rico: Editorial Universitaria.

Haskins, R. (1989). Beyond Metaphor: The Efficacy of Early Childhood Education. American Psychologist, 44, p. 274-282.

Herrans, L.L., Rodríguez, J.M., Roca de Torres, I. (1990, August). Standardization of the WISC-R in Puerto Rico: The process and the preliminary findings. In Testing Minority Students: Puerto Rico's Initiative. Symposium conducted at American Psychological Association's Annual Convention, Boston, Mass.

Hoffman, L.W. (1989). Work, family and the child. In Hackman, J.R., Hoffman, L.W., Moos, R.H., Osipow, S.H. & Tornatsky, L.G. (Eds.) Psychology and Work: Productivity, change and employment (pp. 173-220). Washington, D.C.: American Psychological Association.

Husén, T. & Opper, S. (1984). Educación multicultural y multilingüe [Multicultural and multilingual education]. Madrid: Narcea, S.A. de Ediciones.

Irizarry, R.L. (1989). La escuela como modelo y agente de desarrollo social. [The School as a model and agent of social development]. Homines, Vol. 12, núm. 1 & 2, p. 205-209.

Jacklin, C.N. (1989). Female and Male: Issues of Gender. American Psychologist, 44, 127-133.

Johnson, P.B., Updyke, W.F., Stolberg, D.C., & Schaefer, M. (1966). Physical Education: A Problem Solving Approach to Health and Fitness. New York: Holt.

Kunisawa, B.N. (1988). A nation in crisis: The dropout dilemma. NEA Today. Special Edition. January, pp. 61-65

Maccoby, E., & Jacklin, C. (1974). The Psychology of Sex Differences. Stanford, California: Stanford University Press.

Negrón de Montilla, A. (1975). Americanization in Puerto Rico and the Public School System: 1900-1930. San Juan, P.R.: Editorial Universitaria.

Nelson, C.L. (1991/1992). The National SEED Project. Educational Leadership. Dec.–Jan. pp. 65-70.

Noddings, N. (1991/1992). The Gender Issue. Educational Leadership. Dec.–Jan. pp. 66-67.

Presseisen, B.Z. (Ed.). (1988). At-Risk Students and Thinking: Perspectives from Research. Washington, DC: National Education Association

Quintero Alfaro, A.G. (1974). Educación y Cambio Social en Puerto Rico. Río Piedras: Editorial Universitaria. 223 pags.

Rice, M.L. (1989). Children's Language Acquisition. American Psychologist, 44, 149-156.

Ross, F.R., Garrison, K.C., & Morgan, R.F. (1985). The Psychology of Human Development, Second Edition. New York: Harper & Row.

Ryan, W. (1976). Blaming the Victim. Revised updated edition. New York: Vintage Books, a Division of Random House.

Sattler, J.M. (1982). Assessment of Children's Intelligence and Special Abilities. 2nd. Edition. Boston, Ma.: Allym & Bacon.

Scarr, S. (1981). Testing for children: Assessment of the many determinants of Intellectual Competence. American Psychologist, 36, 1159-1166.

Scarr, S., & Weinberg, R.A. (1978). The influence of "family background" on intellectual attainment. American Sociological Review, 43, 674-692.

Seda-Bonilla, E. (1987). La etnogénesis. [Ethnogeny]. El Sol: Revista Oficial de la Asociación de Maestros de Puerto Rico. Year XXXI, Num. 1 & 2, pp. 4-15.

Sewell, T.E. (1981, Spring). Shaping the future of School Psychology: Another Perspective. School Psychology Review, X, 232-242.

State Department (1952). Constitución del Estado Libre Asociado de Puerto Rico. [Constitution of the Commonwealth of Puerto Rico]. San Juan: Author.

Sternberg, R.J. (1985). Beyond IQ: Atriarchic theory of human intelligence. Cambridge, England: Cambridge University Press.

Sternberg, R.J. (1988). Intellectual Development: Psychometric and Information Processing Approaches. In M.H. Bornstein, & M.E. Lamb (Eds.) Developmental Psychology: An Advanced textbook. (2nd. Edition. pp. 261-295). Hillsdale, N.J.: Erlbaum.

Torres-Zayas, J.A. (1981). Holocausto: La familia puertorriqueña de hoy. [Holocaust: The Puerto Rican family of today]. San Juan: Jay-Ce Printing.

U.S. Department of Education, National Center for Education Statistics. (1991). The Condition of Education, 1991, Vol. 1, Elementary and Secondary Education. Washington, D.C.

Weinberg, R.A. (1989). Intelligence and I.Q.: Landmark Issues and Great Debates. American Psychologist, 44, 98-104.